

**HOW ARE OUR SCIENTISTS MEASURING OCEAN TEMPERATURE UNDER THWAITES GLACIER, ANTARCTICA?**



**(a) A team of Antarctic seals (b) HUGIN, a submarine style robot (c) A diving yellow glider**

**WHAT DO YOU THINK? (a) (b) (c)**

If you answered 'all of the above' you are right! It might seem strange that scientists would pick seals with small instruments glued to their heads to be part of the same project as two high tech robotic instruments. However, each of these 'tools' has an important role to play in helping us to understand how the Southern Ocean's temperature and circulation (movement) might affect Antarctica's Thwaites Glacier. Over the next few weeks we will share a short write-up about each.

**SEALS**

When the US research ship *Nathaniel B. Palmer* left Punta Arenas, Chile, loaded with scientists and headed for Antarctica, on board were several instruments that would be used to collect ocean measurements. Seals, however, were not on board. They would be selected once the ship reached Antarctica. These are native Antarctic Weddell and elephant seals that spend the entire year diving down into the ocean, roaming under the thick floating ice shelves searching for food.

**How do seals collect information?**

Wherever seals travel they can be a science messenger, collecting information about the water they swim through, its temperature, depth and salinity. Because they travel freely under the ice, moving up and down in the water column, it is an efficient way to gather information in a place that is difficult for scientists to reach any other way. Small instrument packets and a transmitter are attached to the seal's head with glue. Don't worry, it is very safe! Each time the seal surfaces, the information they have collected about the water is beamed up by satellite and sent to the waiting scientists. Aside from our project there are about 50 seals currently diving with instruments around Antarctica serving as science messengers.

**How do scientist pick the seals to be science messengers?**

Every Antarctic seal is protected. Special training, permitting and care are required when working with them. Dr. Lars Boehme leads several scientists in selecting and instrumenting the seals on this research trip. The small instrument packets and transmitters they use don't hurt or slow the seals as they swim and dive. Since seals molt, shedding all their fur each summer, it is important to pick a seal that has already finished shedding so that once the instrument is glued in place it has a good chance of staying put for the season. Since seals move out of the water and onto the beaches to shed their fur, this is the easiest place to find them. How can you tell if a seal is done shedding? By giving the fur on their head a quick gentle tug! If the fur stays put then it is time to consider how to safely put them to sleep and add an instrument. The seals can be large! One of the elephant seals collecting data for us is about 7.9 feet (240 cm) and 750 lbs. (340 kg)! Imagine putting an instrument on a seal that size!

**How are the seals doing as science messengers?**

Great! 4 seals dove over 1000 times in the first week and collected ocean salinity, temperature and depth measurements on 94 of the dives. They traveled to depths of over 2600 ft. (800 meters)! Now that's a dive!

The International Thwaites Glacier Collaboration is a partnership between the U.S. and the U.K. Working together the two countries want to understand the unstable Thwaites Glacier in West Antarctica. Over a five year period scientists will use different instruments and tools to study how the changes in the ocean, ice and atmosphere are affecting this part of Antarctica.



An image of Antarctica taken from space. The Amundsen Sea and Thwaites Glacier are tucked in below the Antarctic Peninsula.



The stern (back) of the Nathaniel B. Palmer Research Vessel in the Southern Ocean. It is currently 'home' to the science team.



Thwaites ice shelf, a thick floating section of ice that has flowed from the land into the ocean. The seals hunt under the ice shelf.



Dr. Lars Boehme raises his hand, showing his height to an elephant seal. It complains a bit but leaves the team alone to continue working.

### Science Technology Engineering and Math (STEM) Connections

The following questions are designed to be open-ended leading to a class discussion.

- 1) How does this part of the Thwaites Glacier project bring together different parts of STEM?
- 2) What subjects in school do you think Dr. Boehme and his research team took to prepare them for working with seals?

**Photo credits:** Photo credits: L-R first page, Dr. Boehme, Linda Welzenbach, Tasha Snow. Above top L-R NASA, Tasha Snow, Bottom L-R NASA, Tasha Snow. All seal work was completed under FCO/UK Permit #29/2018

For more on this story check out the blog posts by our field based correspondents:

Jeff Goodell: <https://www.rollingstone.com/politics/politics-features/antarctica-seal-tagging-794759/>

Tasha Snow: <https://thwaitesglacier.org/blog/snow-on-ice>

<https://thwaitesglacier.org>